UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

December 11, 2014

MEMORANDUM

SUBJECT: Updated data requirements for the conditional registration of HeiQ AGS-20

PC Code:	DP Barcode: N/A
Decision No.: N/A	Registration No.: N/A
Petition No(s).: N/A	Regulatory Action: Conditional Registration
Risk Assessment Type: N/A	Case No.: N/A
TXR No.:	CAS No.:
MRID Nos.: N/A	40 CFR: N/A

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The Tables below are updated lists of data requirements for the conditional registration of HeiQ AGS-20 based primarily upon the Agency's review and results of the registrant's textile leaching study (MRID 49141001) and dissolution kinetics study (MRID 49203401).

Tier I: AGS-20 and AGS-20 Treated Textile Testing

Conditional Data Requirement(s)	Review Status	Rationale	Test Substance
Phase 1 – Product Characterization			
Particle Size Distribution	Satisfied	Acceptable end use product studies received	AGS-20
Surface Area			
Phase 2 – Product Testing			
Stability	Satisfied	Acceptable end use product studies received	AGS-20
Storage Stability			
Corrosion Characteristics			
UV-Vis			
Solubility			
Phase 3 – Release Characteristics/Exposure			
Dissolution Kinetics	Satisfied	Acceptable studies received	AGS-20
Leaching Test of Textile			
Dermal Exposure-Indoor	No longer required	Agency determined use of water-soluble packaging satisfied exposure testing (10/22/2013)	N/A
Inhalation Exposure-Indoor			
Attrition Test - Laundry Drying	No longer required	Agency determined Attrition Test no longer needed based on water-soluble packaging and the results of the dissolution kinetics and textile leaching studies (10/22/2013)	N/A
Phase 4 – Health Effects			
90-Day Inhalation Toxicity (Rat)	No longer required	No longer required based on water-soluble packaging which greatly reduces inhalation exposure.	N/A
28-Day Dermal Toxicity (Rat)	Required	The textile leaching study indicated that silver in the form of particulate (>0.45 micron) was released from surface coated textiles. This particulate probably contains AGS-20 particles.	AGS-20
Reproduction/Developmental Toxicity Screening Test	Required	Required based on specific concerns for sensitive organ targets including testes and uterine lining	AGS-20
in vitro micronucleus (MN) assay	Required	Required to define the potential mutagenicity of the specific product	AGS-20
Phase 5 - Ecologic Effects			
Avian Acute Oral Toxicity	Conditional	Waived for the purposes of hazard labeling because of language on the label but if nanosilver particles are found to be attached or within aquatic plant cells in the aquatic plant, Tier II study(ies), and/or found within invertebrates in the chronic whole sediment studies this study is required for a waterfowl. Protocols are required to be submitted prior to conducting the study.	Nanosilver in AGS-20
Aquatic Invertebrate Acute Toxicity, Freshwater Daphnids	Required	The Agency determined a study with the most acutely sensitive aquatic animal species to silver, *Daphnia magna*, is required to support risk assessment and characterization based on results of the textile leaching and dissolution kinetics studies. Protocols are required to be submitted prior to conducting the study.	AGS-20; Nanosilver in AGS-20

Conditional Data Requirement(s)	Review Status	Rationale	Test Substance
Fish Acute Toxicity Test, Freshwater and Marine	Conditional	Based on results of textile leaching study, dissolution studies, and toxicity of other nanosilvers the Agency determined if the acute freshwater invertebrate results with AGS-20 and the nanosilver in AGS-20 demonstrate that their toxicity is significantly more toxic than the other nanosilvers used to support the risk assessment data on an acutely sensitive freshwater and an acutely sensitive saltwater fish species are required to confirm the risk assessment and characterization findings. Protocols are required to be submitted prior to conducting the study.	AGS-20; Nanosilver in AGS-20

Tier II: Testing for Nanosilver and/or AGS-20 Released during Tier I Tests

Conditional Data Requirement(s)	Review Status	Rationale	Test Substance
Phase 6 – Characterization			
Plasmon resonance (UV-Vis)	Required	The textile leaching study indicated that silver in the form of particulate (>0.45 micron) was released from surface coated textiles. This particulate probably contains AGS-20 particles. Agency requires based on the results of the dissolution kinetics and textile leaching studies	Nanosilver in AGS-20
Particle Size Distribution			
Surface Area			
Solubility			
Zeta-potential			
Phase 7 - Health Effects			
90-Day Oral Toxicity	No longer required	No longer required because the dissolution kinetics and textile leaching studies indicated that silver nanoparticles were not released in sufficient amounts to be of concern for human health.	Nanosilver in AGS-20
90-Day Dermal Toxicity (Rat)			
Modified Reproduction/Developmental Toxicity Screening Test			
in vitro micronucleus (MN) assay			
Phase 8 – Ecological Effects			
Modified Aquatic Food Chain Transfer	Conditional	If nanosilver particles are found to be attached or within aquatic plant cells in the aquatic plant, Tier II studies, and/or found within invertebrates in the chronic whole sediment studies this study is required. Protocols are required to be submitted prior to conducting the study.	Nanosilver in AGS-20
Terrestrial Plant Toxicity, Seedling Emergence	Conditional	Based on results of the textile leaching study, the dissolution studies, and toxicity of other nanosilvers the Agency determined if the nanosilver in AGS-20 with the green algae, *Selenastrum capricornutum*, is significantly more toxic than the other nanosilvers used to support the risk assessment, a Tier II (dose response) study with the rice, *Oryza sativa*, with AGS-20 and the nanosilver in AGS-20 is required to confirm the findings of the risk assessment. Protocols are required to be submitted prior to conducting the study.	AGS-20; Nanosilver in AGS-20

Conditional Data Requirement(s)	Review Status	Rationale	Test Substance
Aquatic Plant Toxicity, Tier II	Conditional	Based on results of the textile leaching study, the dissolution studies, and toxicity of other nanosilvers the Agency determined if the nanosilver in AGS-20 with the green algae, *Selenastrum capricornutum*, is significantly more toxic than the other nanosilvers used to support the risk assessment, a Tier II (dose response) study with the duckweed, *Lemna minor*, is required to confirm the findings of the risk assessment. Protocols are required to be submitted prior to conducting the study.	Nanosilver in AGS-20
Algal Toxicity, Tier II	Required-green algae; Conditional-fw diatom, sw diatom, cyanobacteria	Based on results of the textile leaching study, the dissolution studies, and toxicity of other nanosilvers the Agency determined one Tier II (dose response) study conducted with the green algae, *S. capricornutum*, is required to confirm the findings of the risk assessment. If the Tier II *S. capricornutum* result is significantly more toxic than value used in risk assessment data on the freshwater and saltwater diatoms (*Navicula pelliculosa* and *Skeletonema costatum*) and the cyanobacterium (*Anabaena flos-aqua*) is also required.	AGS-20; Nanosilver in AGS-20
Measuring the Chronic Effects of Freshwater Sediment-Associated Contaminants on *Chironomus dilutes*	Required	Based on results of the textile leaching study and the dissolution studies the Agency determined this study is required to confirm the findings of the risk assessment. The more toxic of the end use product (AGS-20) or the nanosilver from the *Hyalella azteca* study is the required test substance. Protocols are required to be submitted prior to conducting the study.	Conditional on *Hyalella azteca* findings
Measuring the Chronic Effects of Freshwater Sediment-Associated Contaminants on *Hyalella azteca*	Required	Based on results of the textile leaching study and the dissolution studies Agency determined study is required to confirm the findings of the risk assessment. Protocols are required to be submitted prior to conducting the study.	AGS-20; Nanosilver in AGS-20
Measuring the Chronic Effects of Marine and Estuarine Sediment-Associated Contaminants on *Leptocheirus plumulosus*	Required	Based on results of the textile leaching study and the dissolution studies Agency determined study is required to confirm the findings of the risk assessment. The more toxic of the end use product (AGS-20) or the nanosilver from the *Hyalella azteca* study is the required test substance. Protocols are required to be submitted prior to conducting the study.	Conditional on *Hyalella azteca* findings
Phase 9 – Environmental Fate			
Rate of Aggregation	Required	Required to determine the rate at which the product aggregates or deaggregates in the aqueous medium (when the product dissolves in an aqueous medium)	AGS-20; Nanosilver in AGS-20
Activated Sludge Sorption Isotherm	Required	Required to determine the effect of AGS-20 and the nanosilver in AGS-20 on microbes present in wastewater sludge	

Conditional Data Requirement(s)	Review Status	Rationale	Test Substance
Adsorption/Desorption (Soil/Sediment)	Required	Required to determine the rate AGS-20 and the nanosilver contained in AGS-20 binds to sediment and soils. (If AGS-20 or nanosilver in AGS-20 does not bind strongly, it will migrate into ground water with a possibly of ground water contamination or if it binds strongly it will result in benthic invertebrate exposure.)	
Leaching Studies (Soil Column Tests)	Waived	The Agency determined that the Adsorption/ Desorption (Soil) study can be conducted to provide information on both partitioning to solids and mobility in subsurface environment and therefore waives this study.	N/A
Modified Activated Sludge, Respiration Inhibition Test for Sparingly Soluble Chemicals	Required	Required to determine if AGS-20 and the nanosilver in AGS-20, which is not highly water soluble, has adverse effects on the microbes present in the activated sludge	AGS-20; Nanosilver in AGS-20

Tier I data requirements are contained in Phase 1 through 5. Tier I, Phase 1 through 3 data requirements are complete either due to a submitted study or a waiver. Additionally the following Tier 1, Phase 4 studies are no longer required:

- 870.3465 90-Day Inhalation Toxicity (Rat) – changes in the packaging for occupational use have changed the exposure profile;
- 850.Avian Acute Oral Toxicity (one species either a waterfowl or an upland game bird) – Waived based on the hazard language placed on the label and the low likelihood of exposure in the environment.

Tier II data requirements are contained in Phase 6 through Phase 9. The following Phase 7 and Phase 9 studies are waived or no longer required:

- 870.3100 90-Day Oral Toxicity – data from a submitted leaching study has indicated that changed the exposure profile (i.e. silver nanoparticles were not released in sufficient amounts to be of concern for human health);
- 870.3250 90-Day Dermal Toxicity (Rat) – data from a submitted leaching study has changed the exposure profile (i.e. silver nanoparticles were not released in sufficient amounts to be of concern for human health);
- 835.1240 Leaching Studies (Soil Column Tests) – the Agency determined that the adsorption/desorption study can be conducted in a manner to acquire the information needed for both studies.